



ELEVATE

Electrification in Chicago: Policies, Partnerships, and Deployment

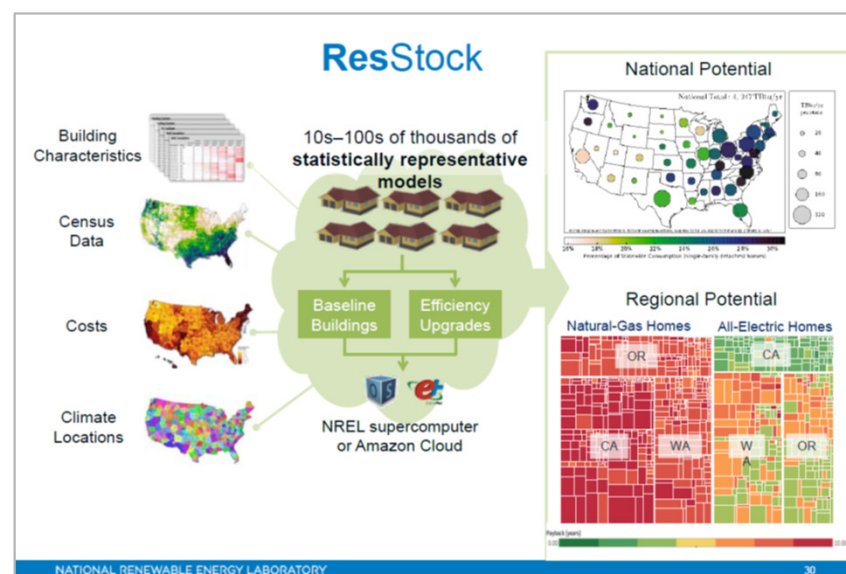
ACEEE Summer Study
August 24, 2022

Angela Tovar, City of Chicago
Anna McCreery, Elevate

DOE ABC Research Partnership

Chicago Energy Efficiency Planning and Analysis, and Integrated Retrofit Strategy Validation in Single-Family Homes: DOE's Advanced Building Construction Initiative

Goal: Demonstrate that >50% energy reduction is feasible in the existing Chicago single housing stock.

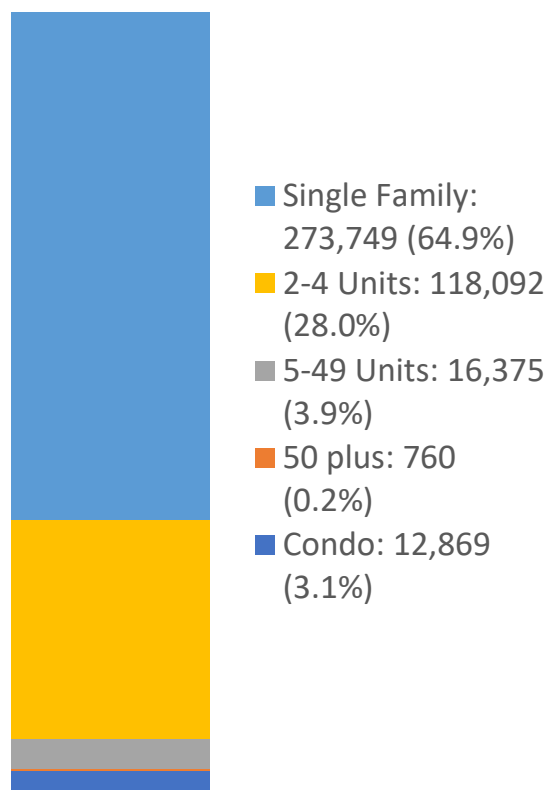


<https://www.nrel.gov/docs/fy22osti/83575.pdf>

The Chicago Housing Stock

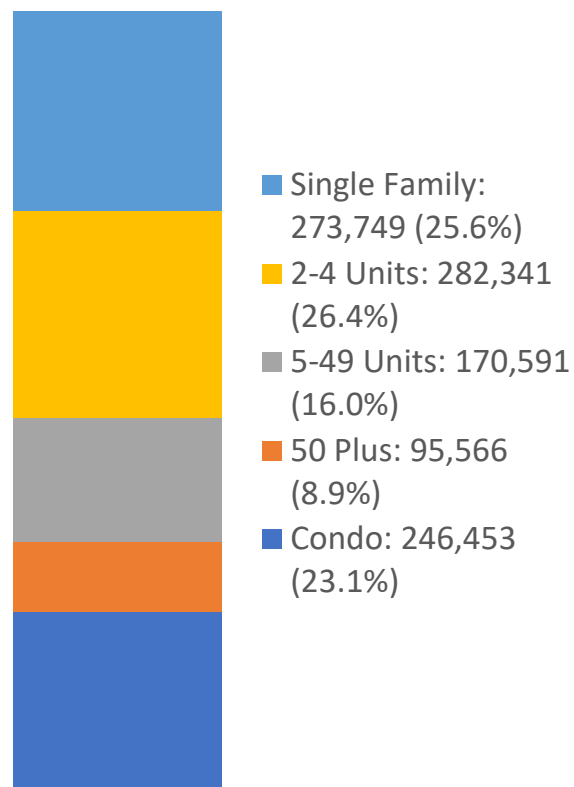
SF and
2-4 unit:
92.9%

Buildings



TOTAL = 438,054

Units



TOTAL = 1,068,700

Predominant Home Types: ~80% of Chicago residential buildings



Single family, Pre-1942
Frame construction
83,028 (19.0%)



Single family, Pre-1942
Masonry/brick construction
60,993 (13.9%)



Single family, 1942-1978
Masonry/brick construction
82,256 (18.8%)



2-4 flat, Pre-1942, Frame
43,812 (10.0%)



2-4 flat, Pre-1942, Masonry
63,732 (14.5%)

A Just and Equitable Climate Future for Chicago



Center Equity
and
Environmental
Justice



Uphold
Commitment
to Climate
Goals



Address
Profound
Environmental
Challenges



Generate
Economic
Benefits for
Local
Communities

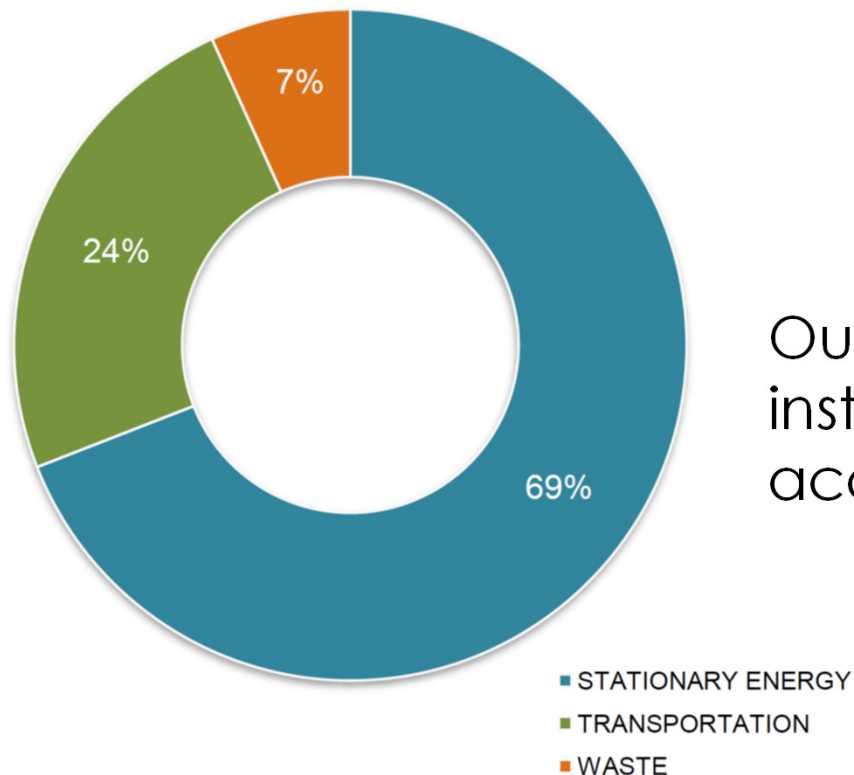
Chicago Green Recovery Agenda



The Green Recovery is advancing four strategies to accelerate a just transition to a green economy for the City of Chicago:

- Climate Action Plan
- Decarbonization
- 100% Renewable Energy by 2025
- Electricity Franchise Agreement

Chicago's built environment represents the largest portion of our emissions profile



Our residential, commercial & institutional, and industrial buildings account for nearly 70% of city's emissions

Chicago Building Decarbonization Working Group

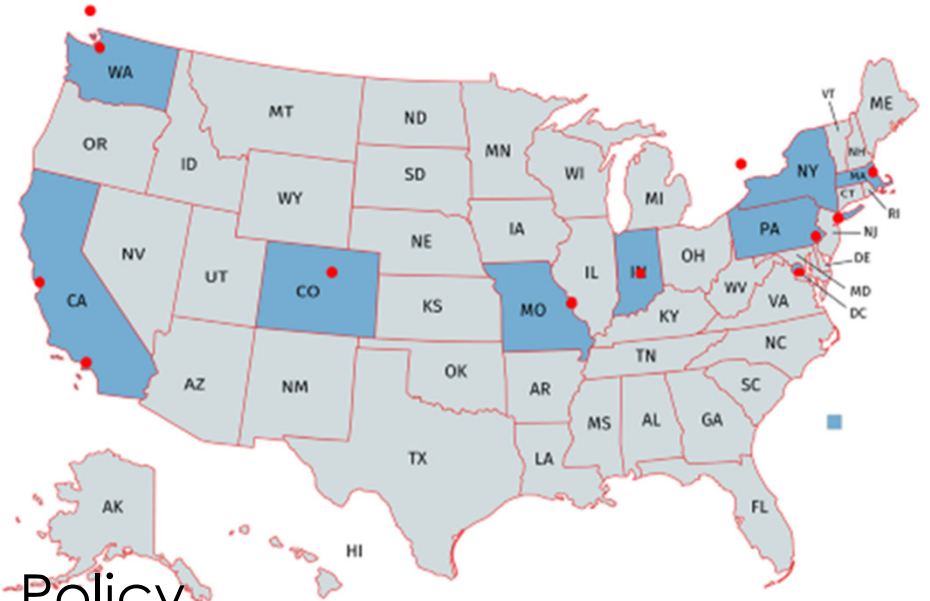


Installation of a “solar flower” garden in Bronzeville, as a result of a public-private partnership.

- **Lower economic burdens** on residents and businesses
- **Reduce energy insecurity** for communities of color
- Use an **equity lens** to assess the costs and burdens of strategies
- Create **economic and health benefits** for those who need them the most

Overall Project Scope

- **Fall 2020**
 - ✓ Best practices research in 12 North American cities
- **November 2020 – May 2021**
 - ✓ Two rounds of stakeholder engagement; 200+ touchpoints*
- **June 2021 – December 2021**
 - ✓ Chicago Building Decarbonization Policy Working Group Convenings



The Working Group



- 54 Working Group members
 - Supported by Project Team: Office of Sustainability; other City of Chicago staff; NRDC; Delivery Associates; and Elevate
- 11 big ideas:
 - New construction
 - Retrofits for existing buildings
 - Programmatic and technical support

Chicago Policy Scan

EXISTING

2008
Climate
Plan

Energy
Benchmarking

Building
Code

Many
independent
community-
based efforts

INVEST
South/West

Sustainable
Development
Code

Retrofit
Chicago

Neighborhood
Power Program

2022 Climate
Action Plan

UPCOMING

Community Goal:
100% renewable
energy by 2035

**Building Code
Improvements**
(Cycle: 2022-2025-2028)

Municipal Goal:
Municipal Energy
Supply 100% renewable
(2025)

**Building
Performance
Standards**
(TBD)

**We Will
Chicago**
(2020-2023)

**Electricity
Franchise
Agreement**
(TBD)

Chicago Recovery Plan

INVESTMENTS



Community + Environmental Justice Investments

- Land + river remediation
- Organic waste diversion
- Low carbon mobility
- Decarbonization of City fleet and vehicles
- Historic trail development

Equitably Growing the Tree Canopy

- Planting 75k additional trees to provide co-benefits to local communities

Energy and Equity

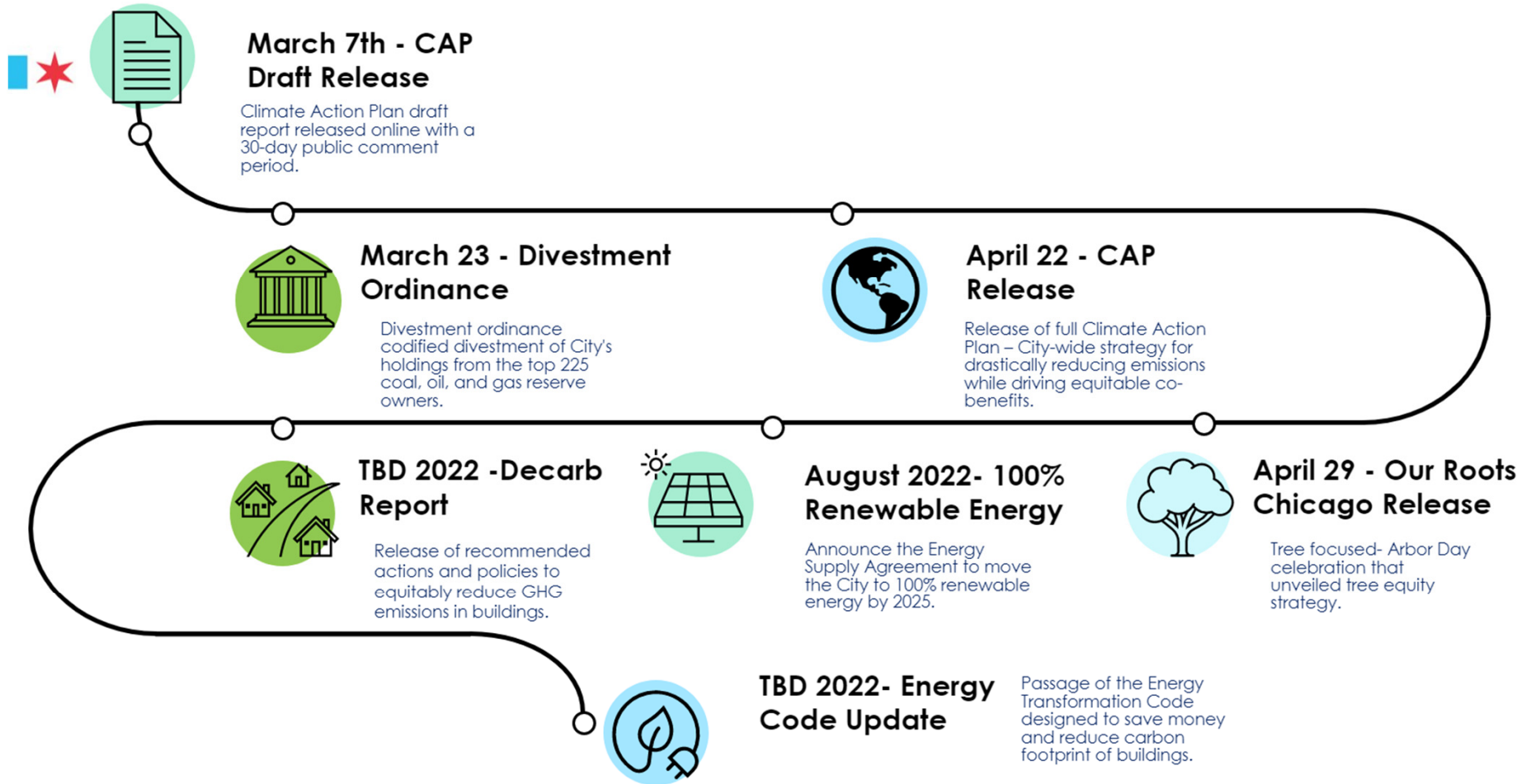
- Retrofitting single and multifamily affordable housing
- Retrofitting neighborhood anchor buildings
- Installing library solar
- Pilot industrial community solar project

Green Infrastructure

- Developing 20 resilient schoolyards
- Strategic expansion of green alleys, bioswales, and other flood mitigation projects
- Investing in flood-vulnerable neighborhoods

In October 2021, City of Chicago adopted a budget that included \$188,000,000 for environmental justice and climate investments.

2022 Key Dates



Elevate: What We Believe



ELEVATE

Equity through
climate action

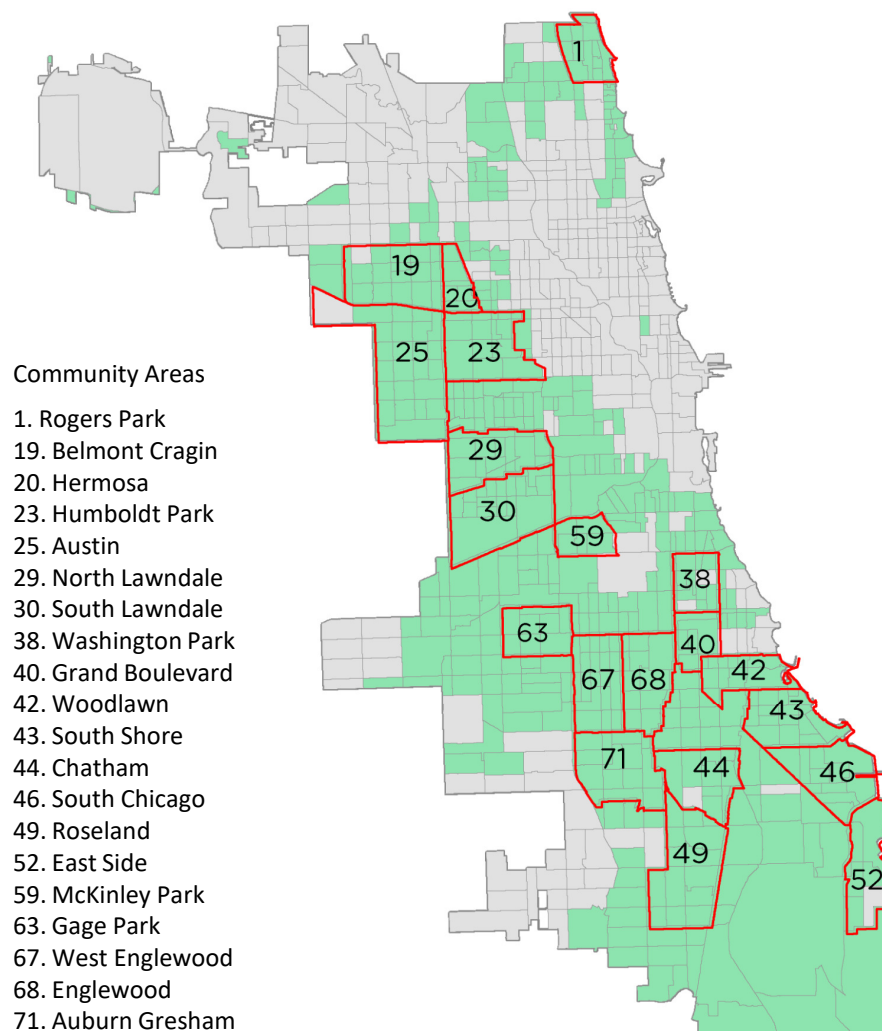
- Elevate seeks to create a world in which everyone has clean and affordable heat, power, and water in their homes and communities — no matter who they are or where they live.



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City- and Community-Scale Modeling of Deep Energy & Electrification Retrofits

Priority Community Areas



	Total residential buildings	Single-family detached buildings		2-4 unit buildings	
	#	#	%	#	%
Priority Community Areas total	133,406	77,814	58.3%	45,817	34.3%
Chicago total	438,054	274,072	64.9%	123,563	29.3%

- ~ 580,000 households in Chicago (54%) earn ≤80% area median income
- ~204,500 households in these 20 community areas (70%) earn ≤80% area median income

Legend:

- Census tracts where <50% of households earn ≤80% of Area Median Income (AMI)
- Census tracts where >50% of households earn ≤80% of Area Median Income (AMI) (ComEd income eligibility criteria)

Key Takeaways

1. Deep energy savings (>50%) can be achieved in the Chicago housing stock with off-the-shelf measures and technologies, and help reduce energy costs and energy burdens
 - Heat pumps are a major driver of energy savings
2. Additional benefits amplify the impact:
 - Climate resilience: heat pumps add efficient cooling in homes that don't have it (~77% of Chicago's 1-4 unit buildings lack central A/C)
 - Improved indoor air quality
 - Thermal resilience in case of power outages

Key Takeaways

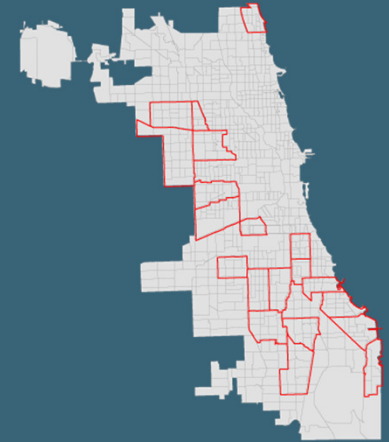
3. Adding solar would offset $\geq 30\%$ of post-retrofit electricity use
4. Methodology: an important first step was to calibrate ResStockTM to local housing stock



392k



323k



110k

Chicago Annual Savings Potential

≥ 59% MBTUs

\$130 – >\$300 million (\$400 – \$1,000 per building)

2.5M metric tons CO₂-equivalent

Solar offset of ≥ 30% of post-retrofit electricity use

- + Air conditioning
- + Improved respiratory health
- + Improved thermal resilience
- + Home value & household wealth
- + Prioritized investment in the communities that need it most

Savings by Home Typology – modeled using NREL's ResStock & Cambium tools



Baseline: 1,350-
2,300 therms
7,320-11,500 kWh
Savings potential:
60-80%
\$500-1,500



Baseline: 1,230-2,110 therms,
7,470-11,980 kWh
Savings potential:
53-77%
\$200-1,300



Baseline: 840-1,530 therms,
6,690-10,220 kWh
Savings potential:
46-72%
\$200-900



Baseline (per unit): 942-1,340 therms
5,310-7,920 kWh
Savings potential (per unit):
57-76%
\$200-900



Baseline (per unit): 860-1,240 therms,
5,430-8,400 kWh
Savings potential (per unit):
50-72%
\$0-700

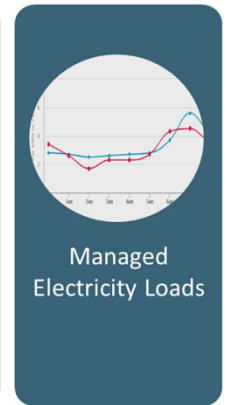
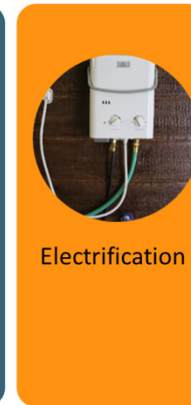
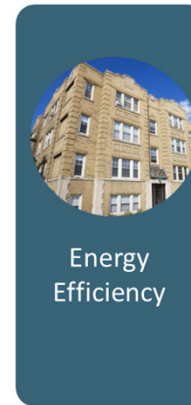


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Building Electrification Program

Elevate's Building Electrification Program

- Need to eliminate fossil fuel use in buildings to combat climate crisis
- People who rent, are older, or have lower incomes are more likely to:
 - Live in older buildings
 - Disproportionally experience effects of climate change
 - Be left behind in climate mitigation efforts



Electrification Feasibility

- Started in 2020
- Technical & infrastructure
 - Replacement Timing Equipment Options
 - Resident Impacts
 - Bill impacts
- Partner with CBOs
- Bilingual resident engagement
 - Property-wide community meetings, Flyers, Door-knocking, Cash incentives



La Paz Place

- 3-building property, 44 apartments
 - Primarily Latinx families
 - 31 affordable at 50% AMI (\$44,550)
 - 13 affordable at 30% AMI (\$26,730)
 - At least half using utility bill assistance programs (e.g., LIHEAP)
- Owned and operated by Bickerdike Redevelopment Corporation (BRC)



Thank you

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